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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE • NOVEMBER 20, 1943

White Death

See Page 328

A SCIENCE SERVICE PUBLICATION

ENGINEERING

Gas Turbines for Ships

Propulsion units with up to 7,500 horsepower may compete with steam and diesel engines in future. Extremely high temperatures reached.

➤ GAS TURBINES, in which the expansive power of heated gases from burning fuel is used directly instead of being translated into terms of steam, may drive future war vessels and merchant ships, it was suggested in a joint paper by Prof. C. Richard Soderberg of the Massachusetts Institute of Technology and Ronald B. Smith of the Elliott Company, Jeannette, Pa., presented before the fiftieth anniversary meeting of the Society of Naval Architects and Naval Engineers in New York.

High efficiency is theoretically possible from such a system, and to a considerable extent is realizable in practice. Beginnings have already been made on at least a small scale: the now familiar turbosupercharger used on American war-planes is a gas turbine utilizing the otherwise wasted engine exhaust as its source of power.

Principal diffculty to be overcome in building practical large-scale gas turbines arises from the unavoidable high temperatures at which they must work—1,200 degrees Fahrenheit or higher. Highest temperature of superheated steam now used in turbines is about 900 degrees. Alloy metals that will stand up to this temperature are available and can be machined, but getting large enough forgings is still a problem.

Despite all this, the two engineers concluded, gas-turbine propulsion units for marine use are distinctly within the realm of possibility, at least up to a maximum of 7,500 horsepower per unit.

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Submarine "Safety"

➤ SAFETY DEVICES that make service on submarines less hazardous in peacetime operations may reverse their function and produce highly dangerous situations in combat, Capt. A. I. McKee, U.S.N., told the meeting. He cited as an example the automatic blow valves formerly used, which would empty the ballast tanks and thus start the ship toward the surface if the dive went below a certain level. In war, Captain McKee pointed out, safety for a submarine often means getting down as deep as possible and staying there; coming to the surface would only expose the vessel to immediate destruction.

On the other hand, what may at first glance appear to be a mere luxury is often an outright military necessity. Air conditioning in submarines provides a case in point: with both temperature and relative humidity hovering between 95 and 100, as is often the case in the tropics, the alertness and combat ability of the crew will not last long unless the caged atmosphere is made more fit to live in.

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SOCIOLOGY

Jobs for 31,000,000

Selective Service already planning its part in post-war task of finding work for 11,000,000 war veterans plus some 20,000,000 war workers.

➤ THE NATIONAL Selective Service System is now organizing its part in the huge and complex post-war task of finding jobs for 11,000,000 or more men and women who will have served with the armed forces, plus some of the 20,000,000 or more war workers who will no longer be needed for making guns, tanks and planes, Col. John N. Andrews, of Selective Service's reemployment division, told members of the Industrial Hygiene Foundation at their meeting in Pittsburgh.

Finding jobs for the war workers is not a legal obligation of Selective Service. Officials, however, consider it a necessary corollary to their work of finding employment for service men and women, to help civilians replaced by service men find other employment.

"All employment problems of returning service people should be handled on a local basis," Colonel Andrews declared. "The operating basis will be the city, town or village."

Clearing House Committees will be set up on national, state and local levels to clear the various problems and distribute them for solution of the appropriate organizations, such as Veterans' Administration, U. S. Employment Service, Veterans' Employment Service, Office of Vocational Rehabilitation of the Federal Security Agency, Red Cross, Civil Service Commission or others.

The U. S. Armed Forces Institute at Madison, Wis., may also be called on to furnish records of courses taken by military personnel while in service, if these are desired to show the veteran's training for a particular job, or his educational status if he is seeking further training.

"Leaders of education will be confronted with the most challenging demand in their history," Colonel Andrews declared.

After the war, it is hoped, large numbers of men will want to continue their education. They will not, however, be willing to spend more than a few months or at most two years on this. They will demand that their education be important, practical and given in concentrated form.

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CHEMISTRY

New Demolition Explosive Contains Some Coal Dust

➤ A DEMOLITION explosive, useful in civil engineering works but also available to military engineers, is covered by patent No. 2,333,275, obtained by W. O. Snelling of Allentown, Pa., and assigned to the Trojan Powder Company. The inventor significantly points out in his remarks that a charge of his explosive will break "completely through a standard railroad rail without mud or dirt stemming or the use of other confining means."

Mr. Snelling's formula calls for a mixture of nitrostarch and TNT (or nitrostarch alone) to make up about half the weight, 35% to 45% barium nitrate to supply oxygen, and the balance of the weight in minor but necessary ingredients, one of which is ordinary coal dust.

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PUBLIC HEALTH

Dial Paint Poisonous

Radium poisoning is still a problem to be considered in war industry. Director of Army laboratory warns against reducing standards.

➤ A WARNING of possible danger to workers in the luminous dial painting industry from certain suggested changes in present safety standards was given by Lt. Col. Raymond Hussey, M.C., director of the Army Industrial Hygiene Laboratory, Baltimore, at the meeting of the Industrial Hygiene Foundation in Pittsburgh.

Protection of these workers from radium poisoning, the tragic fate that overtook certain World War I luminous dial painters, is a very big problem though little is heard about it, Colonel Hussey said. The needs of the present war have increased demands for production workers in this industry several thousand per cent.

The hazard has been kept under control and the workers' health safeguarded in Army plants, he stated. The National Bureau of Standards makes regular, periodic tests of the expired breath of radium dial painters in these plants. When the radon concentration in the worker's breath is found dangerously near the level which indicates that the worker has one-tenth of a microgram of radium fixed in his body tissues, the worker is moved to another job where he will not be exposed to radium.

The reason for these tests and for similar tests of the radon concentration in the air of workrooms is that symptoms of radium poisoning do not develop until several years after the victim has a fatally large amount of radium fixed in the tissues of his body. The only way to make sure this is not happening unsuspectedly is to make the tests which show when the tenth of a microgram of radium, which is all the adult human can tolerate, has been reached.

"Some controversy exists," Colonel Hussey said, "regarding what concentrations of radon in the workroom atmosphere may be regarded as safe."

The State of New York, he reported, is now considering a somewhat lower standard than the present one. In Colonel Hussey's opinion, however, the present standard "is none too securely founded" and the discussion should center over the question of why the present standard for workroom air, instead of a higher one, was selected.

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Fluoride Health Problem

➤ WARNING that the increasing use of fluorine compounds in industry may bring a new industrial health problem was brought by Dr. Robert A. Kehoe and Edward J. Largent, of the Kettering Laboratory, University of Cincinnati, to the meeting of the Industrial Hygiene Foundation in Pittsburgh.

"Since 1940, the annual industrial consumption of fluorine compounds has exceeded 500,000,000 pounds," they pointed out. "Production of steel, hydrofluoric acid, glass and enamel has accounted for almost all of these compounds used.

"Although acute poisoning by fluorides is not uncommon in the home, in industry acute injuries have occurred infrequently and have almost always resulted from accidents involving hydrofluoric acid."

Injury has been reported, they said, from prolonged exposure in industry to air contaminated by dusts containing fluorine salts. Little has been reported concerning the effects of gaseous fluorite.

The injury reported in chronic intoxication was in the nature of an abnormal hardening of the bones which was detected by X-ray examinations.

Although fluorine compounds are employed in at least 25 industrial processes, the hazards involved have not been reported. Workmen in some industries excrete an elevated amount of fluorine. Study of one person indicates that when abnormally large amounts of fluorine are being absorbed, the excretion gives an indication of the rate at which fluorine is being stored in the bones. However, the time interval required for injury to result from this bone storage has not been determined.

Fluorine has had considerable attention from medical scientists in another connection not discussed by the Cincinnati scientists, that of its effect on human teeth. Small amounts in the drinking water cause the disfiguring condition, mottled enamel, while much smaller amounts seem to protect the teeth from decay. (*See SNL*, Oct. 23)

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Health of Key Personnel

➤ HEALTH maintenance of workers, particularly of key personnel, is just as important as plant maintenance, if not more so, Dr. E. J. Stieglitz, of Washington, D.C., declared.

"Though the 'tired business man' has been the butt of many a joke, it is no joke that his weariness impairs his efficiency," Dr. Stieglitz said.

"Just as it is the Flight Surgeon's responsibility to ground pilots when not fit to fly," he continued, "it should be the responsibility of industry's medical advisers to 'ground' key personnel when unfit to carry on."

War and the changing population structure will force industry in the future to employ an increasing number of older persons, he pointed out. This need not be a handicap because the effects of the aging process on industrial efficiency are not all in the nature of a decline. Certain skills and abilities may decline but others can be developed as men grow older. It is grossly extravagant, he said, to discard these skills that grow with age, just because some have declined.

Present classifications for physical fit-

DRAGON FLY NECKLACE—This is a photographer's idea of how to show graphically the minute size of some aircraft instrument jewels made by the General Electric Company. They are so small it would require 1,650,000 to fill a gallon jug.

ness, he continued, have one serious flaw; this is that they fail to take into account the promise of continuing capacity for working safely and usefully.

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Protecting Welders' Lungs

➤ ELECTRIC ARC welding does not cause any lung changes even after many years of work, if the work is done in large rooms where the fumes are not allowed to concentrate excessively near the breathing level, Dr. O. A. Sander, of the Industrial Hygiene Foundation's medical committee, reported.

His conclusions are based on studies of a group of welders followed for eight years.

Excessive inhalation of concentrated fumes, especially in confined and unventilated places, may cause siderosis, or iron deposits, in the lungs in from six to 10 years. The siderosis consists only of the deposits of inert iron pigments without fibrous tissue proliferation and without progressive changes after exposure is materially decreased.

Electric welding and siderosis do not predispose to tuberculosis or other lung infection or function impairment.

Any respiratory involvement may be prevented, Dr. Sander declared, even with the most confined work, if proper precautions are taken either by adequate exhaust ventilation or positive pressure respirators or both.

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PHYSIOLOGY

Thiamin Synthesis in Man

Humans as well as rats found to have intestinal bacteria which manufacture important B vitamin. Finding may affect sulfa drug treatment.

➤ HUMANS as well as rats and ruminant animals have in their bodies a factory that manufactures thiamin, or vitamin B_1, Dr. Victor A. Najjar and Dr. L. Emmett Holt, Jr., of the Johns Hopkins University Department of Pediatrics, have discovered. Their findings seem to give the first direct evidence for the biosynthesis of thiamin in man. (*Journal, American Medical Association,* Nov. 13)

For seven weeks four young men lived without sign of vitamin hunger disease on a diet completely lacking in thiamin. They were not getting the vitamin in pills or from any other outside source and they had been on low thiamin rations so long that little or none could have remained stored in their bodies from previous supplies. A similar group of four young men on the same diet regimen did develop signs of thiamin deficiency such as neuritis, swellings, loss of appetite and vomiting.

Tests of the four who stayed healthy without any outside supply of the vitamin showed that they were excreting large amounts of free thiamin in their intestinal wastes. Further tests convinced the Hopkins scientists that these four thiamin-starved young men were getting enough thiamin to stay healthy from bacteria in their intestines. Intestinal bacteria have been known to produce thiamin for rats and ruminants, but so far the question of whether man's intestinal bacteria could supply him with thiamin has been largely unanswered.

Whether the intestinal bacteria could supply enough thiamin to keep a man healthy for an indefinite length of time has not yet been determined. It may be that you have to feed your bacteria minute amounts of thiamin or some other diet ingredient to keep your thiamin factory producing.

Diet rules regarding thiamin requirements seem likely to be revised in the future as a result of these findings. A number of contradictory points may be explained, such as why beriberi from lack of thiamin develops much more frequently among rice eaters than among those who live largely on other milled grains.

Sulfa drug treatment also is likely to be revised somewhat as a result of the discovery of the Hopkins scientists. Part of their search for the thiamin supply that was keeping the young volunteers healthy on a thiamin-starvation diet consisted in giving them doses of succinylsulfathiazole every four hours for one week.

At the end of the week, there was no more free thiamin in the intestinal wastes, evidence that the thiamin-producing bacteria were being destroyed or put out of production by the sulfa drug. This suggests that in the future when doctors give a sulfa drug for intestinal infection, such as dysentery, they will be giving thiamin pills to make up for the production loss in the body's factory.

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BOTANY

Scottish Heather Used In New Timber Substitute

➤ SCOTTISH HEATHER, hitherto regarded as lovely but useless, may soon become the source of a vital industry. Erica, the genus of plant to which purple heather and ling belong, is the raw material of a new timber substitute.

The material, halfway between a plastic and a natural product, is a serious rival to plastics in many fields.

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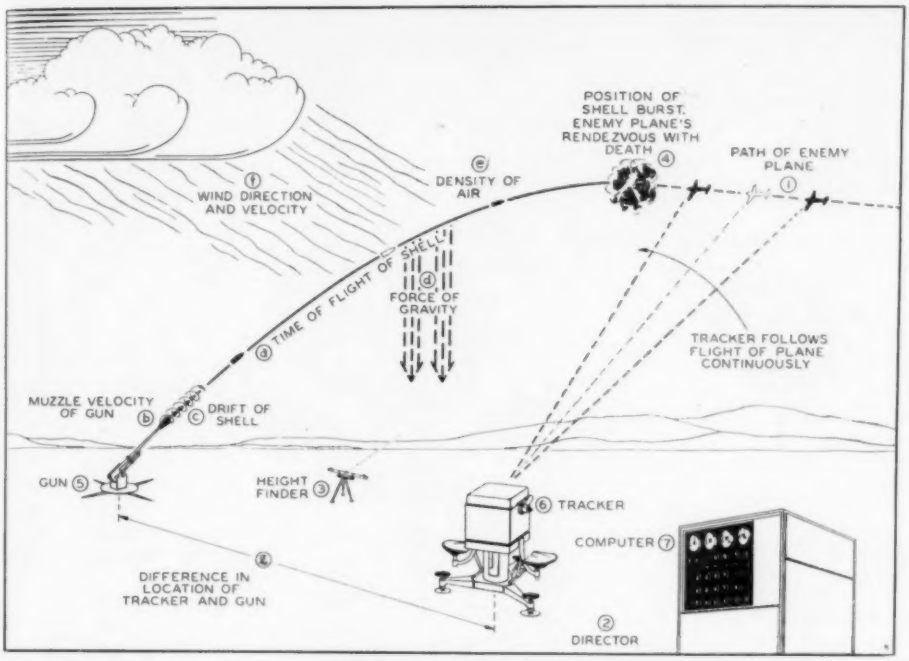

***ELECTRICAL FIRE DIRECTOR**—This diagram shows how a new instrument, after automatically integrating all the variable factors in the firing data, by remote control directs the fire of a battery of anti-aircraft guns so that their shells will be exploding at a predetermined point in the enemy's path at the instant the target is due to arrive there.*

ORDNANCE

Shoots by Remote Control

Electricity replaces gears and cams in new anti-aircraft fire director, which eliminates the need for individual gun pointers.

➤ BAD NEWS for Axis bombers was written in northern New Jersey, near New York City, when a battery of 90-millimeter anti-aircraft guns swung their long barrels evenly in unison, under remote control of a new electrical fire director. The demonstration was staged in the presence of a group of high-ranking Army officers, scientists and technical writers, under joint auspices of the Ordnance Division, U. S. Army, and the Bell Telephone Laboratories.

Cannoneers rapidly load and fire the pieces, but no gunners peer through sights at the aerial targets. Training of the guns, as well as proper adjustment of fuze setters for the shells, is taken care of yards away by a single mechanism operated by a few men, who keep telescopic sights fixed on the target and adjust a few dials. The firing data, automatically calculated inside the machine, are also automatically expressed in terms of electrical currents which are fed through cables to motors controlling the movements of the guns.

Superficially, the new fire control instrument looks much like the mechanical devices already in use for this purpose. Inside, however, it is totally different. Existing fire control instruments use trains of cams and gears to translate movements of telescopic sights and dial adjustments into terms of predicted position of the target at the time of shell burst. The new instrument eliminates the mechanical train and uses instead an electrical hook-up, which is even more accurate and much more sensitive, since it can include variable factors not taken into the calculations of existing machines.

Elimination of the metallic cams, gears and shafts of the mechanical train automatically does away with one source of error: temperature changes cause expansion and contraction of metal parts, but have practically no effect on the new electrical mechanism.

Another improvement that has been introduced is a smoothing effect, that automatically ignores sudden, jerky movements sometimes necessary in making quick changes of adjustment. By the time the final integration made by the instrument, suitably stepped up to the power necessary, begins to swing the heavy guns, the changes have become even and steady, corresponding more closely to the actual motion of the target in the air.

The fire control instrument demonstrated was of the mobile type, suitable for accompanying anti-aircraft guns traveling with an army. The system is equally well adapted for use in fixed positions on land and on shipboard.

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ENGINEERING

New Radiolocator Uses Short Bursts as Signals

➤ A RADIOLOCATOR operating on a different principle from the ones now in use, formally classified as a "distance measuring system," is covered by patent No. 2,333,688, issued to Francis H. Shepard, Jr., of Rutherford, N. J., and assigned by him to the Radio Corporation of America.

Existing systems for locating remote objects by means of projected and reflected electromagnetic waves send out continuous beams. Reflected waves are picked up by two or more detectors at the ends of measured base lines and the distance arrived at by calculating the angles at the base, in a way familiar to all high school students.

Mr. Shepard's system makes use of only a single detector. His projector hook-up is so arranged that it automatically cuts off the projected waves in exceedingly short "bursts." Although these waves travel with the speed of light, the sensitiveness of the receiving apparatus is claimed to be so high that the time elapsed in their travel to and from the objective can be accurately measured. The dial is graduated directly in miles, yards or other units of distance.

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RADIO

Three-Color Television Tried by New Method

➤ A NEW TRY at the difficult problem of producing television in three colors has been made by the well-known radio engineer, Ernst F. W. Alexanderson of General Electric, who has assigned rights

in his patent, No. 2,333,969, to his employing firm.

Big headache in television is the terrifically wide wave band required for transmission, even in one color. It is practicable to split the band for two colors, but not for three. It is also practicable to send two colors in rapid alternation, but with three it doesn't work.

Mr. Alexanderson's system is to split the band, send one color continuously on one half, and use the other half for rapid alternation of the other two. Images in the three separate colors are then optically superimposed by means of mirrors, prisms or lens trains, to form one multi-colored picture.

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NUTRITION

Guava Vitamins

Fruits of tropical guava shrubs have high vitamin C content; powder of the fruit is now being used by British troops as valuable source of the vitamin.

➤ GUAVA POWDER, obtained from the fruits of a neglected tropical shrub, is now being used by British troops as a rich source of vitamin C, and research in the United States indicates that the fruits may become more popular here.

Dried guava is so rich in vitamin C that a little over four ounces would protect an Arctic explorer from scurvy for almost three months. In the *Handbook of Nutrition,* published by the American Medical Association, Dr. Russell M. Wilder and Thomas E. Keys of the Mayo Clinic point out that the powder is reputed to contain a "rather phenomenal quantity of ascorbic acid (vitamin C), 2500 to 3000 milligrams per 100 grams," according to research reports from South African laboratories.

Researchers, working at the South African Institute for Medical Research and the Government Chemical Laboratories in Johannesburg, found that the vitamin could be preserved best by blanching the unpeeled quartered guavas after the central pulp and stones have been removed. Then the fruit is dried at 130 degrees Fahrenheit for 10 to 12 hours and powdered. The product is pleasantly aromatic but has little taste.

Vitamin C was found to be at the high level of 2.5% to 3%, even exceeding such rich sources as dried rose hips, which are reported to contain about 2%.

Other researchers have found that the rich vitamin content is lost rather readily in warm climates. Fresh guavas are little affected by stewing, however, and canned guavas proved stable.

Guavas of different varieties grow wild profusely in the tropics and vary widely in their vitamin C content. Natives remove the seeds of the fruits, add sugar and boil the fruit down to a paste.

Guava paste and jelly are made in Florida, too, where the fruits grow fairly well. At the California Experiment Station in Riverside, hundreds of guava trees have been bearing fruit, many since 1918. They are a hardy lot, with what Dr. H. J. Webber of the Experiment Station calls the habits of a weed. The plants thrive in almost any type of soil from sterile and coarse to rich and loamy, and from very dry to very wet. California experiments reveal that cold is about the only "limiting hazard."

A plant for dehydrating guava fruits is now nearing completion in Cuba.

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CONSERVATION

Exposed Soil Is Painted To Prevent Soil Erosion

➤ A METHOD for painting freshly exposed soil in such places as railroad and highway cuts, on embankments and terraces, etc., won patent No. 2,333,959 for R. J. Smith, of Kansas City, Kans. The idea of giving a water-proof coating to such soil surfaces is not new in itself, but the inventor points out that it is important to permit natural vegetation to come in and esablish permanent stability with a webbing of roots.

Hence he compounds his soil paint in such a way that it will presently crack, permitting rain and air to enter the soil and plants to establish themselves in the cracks. He also recommends giving the soil a dressing of fertilizer.

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ENGINEERING

New Device Teaches Men Height, Range Finding

➤ SOLDIERS and sailors under training in the use of range and height finders can now carry on their class exercises with as much realism as if they were using the costly, complicated instruments themselves out of doors. This

STEREOSCOPIC TRAINER—This instrument lets soldiers learn the operation of range-finders and anti-aircraft height-finders without leaving the classroom. Miniature optical targets inside the device imitate battle targets in motion and thus make it unnecessary to use actual height-finders for training. The instrument can even reproduce a plane flying across the sky and held in the beam of a searchlight. It was designed by the Eastman Kodak Company and is now being produced by the Rochester Ordnance District.

IN ACTION—Here, in South Pacific action, is shown in an official U. S. Marine Corps photograph one of the instruments for which operators are trained by the new stereoscopic device shown on the facing page.

is made possible by a new device, called a dynamic stereoscopic trainer, now in production at Eastman Kodak.

In battle use, a range finder trains telescopic lenses at opposite ends of a long transverse tube on the hostile ship, tank or other target. The operator, looking into eyepieces at the middle of the tube, manipulates knobs and levers until the two separate images coincide. Mechanically made calculations immediately show the range on a dial. The height finder is a similar instrument that determines the height of an airplane above the ground, as well as its range.

In the new training device, miniature images of ships, tanks, planes and other moving targets are projected into the field of vision within the instrument itself. Lighting can be so adjusted that they will appear as if in full daylight, or caught in a searchlight beam, or under any other desired conditions. The trainee manipulates controls exactly like those on the field instruments, gaining proficiency and confidence.

An added feature in the new stereoscopic trainer is an automatic registering mechanism, which sets down the student's score of successes and failures on paper, thereby aiding the instructor in strengthening his aptitudes and correcting his weak points.

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MEDICINE

Wounded Return

Nearly half of American service men who have suffered casualties returned to active duty after treatment; only one-tenth hospitalized.

➤ FORTY-ONE per cent of United States war wounded have been returned to active duty after hospitalization.

This figure does not include wounded who are treated at first-aid stations near the battle fronts and who rejoin their units in a few days. The Hospital Administrative Section of the Medical Department, Army Service Forces, says that only 10% of total casualties are hospitalized when actually many times that number are wounded and sent back to active duty.

Of the 26,666 United States wounded in all theaters of operation up to September 15, 1943, more than 10,975 have now completely recovered and have been returned to duty.

Casualties in this war have been far less than generally anticipated in all quarters. Consultants in the Medical Department are unanimous in stating that the convalescence period of war wounded is greatly lessened by use of sulfa drugs, plasma and other drugs, and the technique of quick evacuation of wounded to advanced surgical centers. In this war there have been fewer amputations than in the last, with a consequent shortening of time spent in hospitals.

Physical disability discharges in the Army since Pearl Harbor to August 1, 1943, totaled 208,296. Of these, more than half were of miscellaneous nature and the remainder were broken down into five classifications—neuro-psychiatric, heart disabilities, impairment of vision, tuberculosis and disabilities resulting from wounds.

Said Maj. Gen. Norman T. Kirk, Surgeon General, "The Army has not granted disability discharges to any men who could be used effectively in the military prosecution of this war."

Every attempt is made to use a skilled man before he is given a Certificate for Disability Discharge. Rehabilitated wounded are returned to different jobs in the Army where they can be most useful, both overseas and in this country. A man is not discharged if his commanding officer thinks he can use him. For instance, an aerial engineer may no longer be fit for combat but he may be useful on ground duty overseas or may become an instructor or inspector in one of the Army depots. Rehabilitated wounded are being used as telephone operators, clerks, chauffeurs, office workers and in utility sections.

There are known cases of soldiers who have lost an eye yet still hold a military assignment. Non-combatant jobs go to many with amputations.

Before a discharged soldier is sent home he is interviewed by the Red Cross and the United States Employment Service. They know his civilian occupation and his Army experience and education. He is given a letter of introduction to take home to local representatives of those agencies. If he desires, they strive to acquire fitting employment for him.

Some civilian firms want to give old jobs back to the men who have received CDD's but cannot because of group insurance policies required of employees. For this reason, the War Department is inaugurating a policy whereby a certificate will be carried by a discharged man on which the reason for discharge will be stated. Such reason, in the case of a neuro-psychiatric, would not be stated.

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MEDICINE

Canadian Navy Announces Seasickness Remedy

➤ PREVENTION or cure of seasickness can be achieved in three out of four cases by pink pills developed by the Royal Canadian Navy, Naval Service Headquarters in Ottawa has announced.

The formula for the remedy, which appears to be equally effective in air sickness, is a military and naval secret. The remedy has no harmful effects and does not reduce fighting efficiency. The pink capsules are now being manufactured in quantity and will shortly be issued to ships for general use at sea. They will probably not be available for civilian use until after the war.

The new remedy was developed after extensive research for a medicine to keep naval personnel at top efficiency, particularly during the first two days of a voyage when seasickness is most likely to occur, and to protect invasion troops from being so disabled by seasickness that they cannot fight when landed.

Surg. Capt. C. H. Best, R.C.N.V.R., co-discoverer of insulin, and Dr. Wilder Penfield, of the Montreal Neurological Institute, head the group of research experts who have produced the remedy.

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RESOURCES

Anti-Freeze Materials Now Available

➤ APPROACHING winter weather means the old car will soon need its cold season dose of anti-freeze. Standard anti-freeze mixtures may now be purchased for passenger cars although the available quantity is limited. Prior to Oct. 1, it was available only for trucks, buses and heavier vehicles in which evaporation from over-heating is a factor.

Careful car drivers who saved their anti-freeze solutions from last winter may reuse them with safety if they are of the ethylene-glycol or alcohol type. Before they are put back in radiators they should be filtered to remove sediments and tested for acidity and strength.

Some additional inhibitor compound may have to be added to increase the protection against rust formation. Inhibitors usually contain a soluble oil or other material to prevent rust, and some material to neutralize acidity.

If the used anti-freeze is "a deleterious salt or oil type, it should be drained and discarded immediately, and the cooling system should be thoroughly cleaned and flushed," according to a recent government publication issued by the Office of Defense Transportation. It is called *Cooling System: Cleaning, Flushing, Rust Prevention, and Anti-Freeze.*

"Acceptable and commonly used anti-freeze materials are ethylene-glycol, ethanol (denatured ethyl alcohol), methanol (synthetic methyl alcohol), and isopropyl alcohol," the bulletin states. "Oils, sugars and inorganic salt solutions are unsatisfactory for one reason or another."

Standard anti-freeze products using any of the recommended ingredients already contain chemical inhibitors to increase their chemical stability and to prevent corrosion. Water, itself chemically stable, attacks metals in the cooling systems vigorously under the influence of the heat and the air present in it during operation. The protective value of the ingredients of the inhibitor may be exhausted by the end of a season's use. The anti-freezing properties are unimpaired.

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MEDICINE

New Cancer Clinic Opened in Mexico

➤ WHEN a little girl broke open her piggy bank and took her whole treasure of carefully saved centavos to government officials to help build a projected cancer clinic, grown-up citizens of Guadalajara, Mexico, broke with the Mexican tradition of leaving it to the government to provide such community health facilities and contributed 32,000 pesos (about $6,400) for the clinic.

The story of the little girl, Miligras, who knew the importance of a cancer clinic because her mother had died of cancer, was told to distinguished scientists of Mexico and other American republics when the new, finely equipped clinic was opened during the first Mexican Cancer Congress held in Guadalajara.

President Avila Camacha has asked that a National Institute of Cancer be organized in Mexico as soon as possible, Dr. Gustavo Baz, Minister of Health, announced at the congress which signalizes Mexico's declaration of war against cancer on a national scale.

An Inter-American Institute of Cancer was visualized as a post-war possibility by Dr. R. R. Spencer, director of the U. S. National Cancer Institute, who was a speaker at the congress.

Science News Letter, November 20, 1943

IN SCIEN

CHEMISTRY

Phosphorus Hand Grenade Fiery Weapon Against Japs

See Front Cover

➤ BURSTING like a fiery tidal wave is the white phosphorus hand grenade shown on the cover of this SCIENCE NEWS LETTER. This type of grenade is one of the newer weapons developed by the Chemical Warfare Service of the Army Service Forces. The picture, a U. S. Army Signal Corps photograph, was taken during a test.

White phosphorus, contained in both mortar shells and grenades, is being used by U. S. troops with deadly advantage against enemy entrenchments where other weapons fail. The Japs, according to eye-witness accounts from the Pacific fronts, are especially allergic to white phosphorus, tumbling out of their pillboxes and fox holes with great alacrity when WP grenades are tossed in.

The newest type WP grenade was developed largely through the efforts of engineers of the New York Chemical Warfare Procurement District.

Science News Letter, November 20, 1943

CHEMISTRY

Better Liquid Chlorine Made by Improved Process

➤ MORE EFFICIENT preparation of chlorine in liquid form is the aim of the system on which Luke H. Sperry of Wilmington, Del., received patent No. 2,333,748. Like all gases, this greenish, poisonous, but industrially important element can be liquefied by either low temperature or high pressure, or by a combination of both. Moderately low temperature and high pressure are favored by most producers.

There is a drawback, however, in that small amounts of sulfuric acid, left in the chlorine at the end of the customary production process, rapidly ruin the cylinders of the compressors. Mr. Sperry simply passes the chlorine through a mass of prepared coke, which takes out the acid, leaving the chlorine itself harmless to the compressors.

Rights in the patent are assigned to the Hercules Powder Company.

Science News Letter, November 20, 1943

OVERSEAS EDITION

SCIENCE NEWS LETTER

THE SUMMARY OF CURRENT SCIENCE • NOVEMBER 1943

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In Gear

A SCIENCE SERVICE PUBLICATION

Pea pods and vines, byproducts of canning, are valuable cattle food.

Nine war-built *aluminum* production plants owned by the government have an annual capacity of 1,200,000,000 pounds.

Cigarette paper has a new use: it is put over wounds which have been covered with sulfanilamide powder, and is said to be an improvement over gauze.

Maps printed with *fluorescent ink* on special paper are used in combat areas; they can be read at night without other illumination.

Industry is producing for the Army a *map paper* which can be soaked in fresh or salt water without injury to the paper or map.

A mixture of two parts sodium fluosilicate, one part phenothiazine, and one part of ordinary wheat flour, is being used successfully on cattle to destroy both sucking and chewing *lice*.

The 1943 fall hunting season for *migratory game birds* which lasts 70 days, begins Sept. 25 in the northern zone, Oct. 15 in the intermediate zone, and Nov. 2 in the southern zone.

One-half the industrial *alcohol* needed in the United States in the next 12 months will be produced by the beverage alcohol industry.

Eye examinations show that about one in every four working persons in their twenties have *visual defects;* at 40, approximately 50% of all workers have defective vision.

Total *food production* in the United States this year is expected to exceed last year's record production by about 5%.

Some 25,000,000 *waterfowl* of various migratory species visited Federal wildlife refuge areas in their southward journey in the fall of 1942; mallards included numbered about 11,600,000.

Do You Know?

Over 4,600,000 acres of national *wildlife refuge* land in 18 states are being used by military authorities for bombing ranges, gunnery ranges, air bases, tank maneuvering areas and other purposes.

Agar-agar, formerly obtained from Japanese and Chinese *seaweed* and used in the artificial cultivation of bacteria, is now a scarce material; the U. S. Bureau of Fisheries is searching for American agar-producing seaweeds.

The Army is using more and more *boneless beef,* frozen in containers, instead of carcass beef as a field meat ration; the Army boneless meat is prepared in three classifications: steaks and roasts, boiling pieces and ground meat.

Lactic acid which makes sour milk sour is a valued material in several industrial, medical and food uses; it is used in tanning, in carbonated beverages and feeding formulas for babies, and as calcium lactate to supply lime to the body.

Over *33,000,000 acres* scattered over the entire country, that can not be tilled or used for pasture or timber, could be used for wild berries, plums, cherries, grapes, currents, elderberries, hazelnuts and other wild foods.

Nylon formerly used almost wholly in clothing, is now used in paint and tooth brushes, parachute covers and shroud lines, harness straps, belting, wire insulation, window screens, and products resembling leather, sponges and cork.

Lime phosphates constitute 6/7 of the solids in human bones.

A ton of *cabbage,* when dehydrated and compressed, occupies two cubic feet.

Over 5,000 workers are now collecting latex for *rubber* in the forests of Guatemala, Nicaragua and Costa Rica.

Apple production in the United States will be about 93,000,000 bushels, approximately 28% less than in 1942.

Losses by *fire* in the United States amounted to $315,000,000 in 1942; they threaten to reach $400,000,000 this year.

Fats are among the earliest medicines used by man; the fat of nearly every animal was believed to have some medical value.

Over 162,000 deer and elk *hides* collected during the 1942-43 hunting season, have been used for service gloves and other military purposes.

The 1,000,000th standard *shotgun* of the type used for training Army Air Force aerial gunners was recently received and accepted by the Army.

Egg-breakers in egg-drying plants are responsible for catching off-quality *eggs;* human noses and eyes are not apt to be replaced by any mechanical device for this purpose.

Rayon is now used in cartridge and powder bags for artillery; like silk, it burns instantaneously, leaving no heated fragments which might prematurely ignite the next powder charge.

Electric *motor clinics* to which farmers may bring motors for cleaning and adjustment are conducted by the New York State College of Agriculture in rural centers throughout the state.

A larger allotment of *copper wire* for farmstead wiring is now available if to be used for essential food production.

Australia is planning to grow twice as much *vegetable foods* in its summer season now approaching as it did a year ago, particularly to help feed Allied forces in the South Pacific.

OVERSEAS
edition
SCIENCE NEWS LETTER
November 1943

The Summary of Current Science, published by Science Service, Inc. 1719 N St., N.W., Washington 6, D. C., U. S. A. Edited by Watson Davis. Vol. 44. Nos. 13-17. Entered as second class matter at the post office at Washington, D. C., under the Act of March 3, 1879. Title registered U. S. and Canadian patent offices. Science Service is the Institution for the Popularization of Science organized 1921 as a non-profit corporation with trustees nominated by the National Academy of Sciences, the National Research Council, the American Association for the Advancement of Science, the E. W. Scripps Estate and the Journalistic Profession.

This insert shows the page size, type size and cover of

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•New Machines and Gadgets•

❁ *PADLESS crown caps for bottles or cans, recently patented, require no rubber, cork or other sealing material. A slightly lowered, flat center, which fits the neck of the bottle, plus a crimped edge makes an airtight seal when the cap is pressed into position.*

❁ *WOODEN PEGS and collets made of small, hollow cylinders may replace nails in fruit and vegetable boxes. The collets, quarter-sawed part of their length, are wet with glue and inserted in holes. Tapered pegs are then driven into the hollow centers.*

❁ *TRANSPARENT plastic sheeting is furnished Army officers to protect field maps. An adhesive back holds the sheet permanently in place over the map. It protects against moisture, grease, dust and sand.*

❁ *POWERFUL PORTABLE searchlights with a strength of 110,000 beam candle-power and a weight, including batteries, of twelve and a half pounds, are available for military and civilian use. Objects may be seen a half mile away. The battery cells are made of a transparent plastic.*

❁ *HEAVY GUN TUBES made from seamless steel tubing is a war development which saves much time and material. By this method a single production line turns out over 6,000 tubes for 75 and 40 millimeter guns in a month. It replaces the old standard forging method.*

❁ *A DOUBLE-EDGED razor blade rolled into an open cylinder with the two cutting edges facing each other, together with a special handle and sharpening device, has been patented. It may be pulled or pushed, one edge cutting and the other acting as a guard.*

❁ *NON-REFLECTING eyeglasses and windshields are made by an improved surfacing treatment. Greater visibility results from its use on show windows and cases, clock faces, and instrument boards. The method can also be applied to large areas of varnished woods, metals or photographs.*

❁ *PAPER CONTAINERS in quart and gallon sizes are used by one paint manufacturer instead of metal cans. The side walls are made of several layers of spirally wound paper strips firmly glued together. These paper paint cans are claimed to be unbreakable and leakproof.*

❁ *LIFE-SAVING LAMPS help locate men overboard at sea. They are completely encased in water-proof plastic with transparent red tops.*

❁ *TRANSPARENT PLASTIC bags protect warplane fuselages during shipment overseas. A single large plastic sheet is wrapped around the fuselage and sealed. When air inside is pumped out, the bag collapses and forms a tight-fitting coat. Moisture inside is absorbed by enclosed bags of silica gel.*

❁ *HEAVY TRUCK and tractor tires stuck to rims are easily removed with a new type of tool. By a system of hooks and leverage the bead is forced loose in a few minutes. This bead-lobsener was developed from a similar tool used to remove airplane tires vulcanized to rims by heat generated in landing.*

❁ *SKI-TROOP FOOTWEAR with rubber-cleated soles and heels, now in production, provide excellent traction on stone and ice. These new mountain-climbing boots clear themselves automatically of snow and ice and are nearly noiseless in use.*

❁ *DOUBLE PROPELLERS which rotate in opposite directions around the same axis are aiding the development of more powerful airplane engines.*

❁ *ADZ ATTACHMENTS for hammers convert them into cutting tools to dress off lumber. The device is quickly installed over the claw of the hammer and held firmly in place by a wedge lug between the claw and a strap which passes over the handle.*

❁ *TRAFFIC CONTROL semaphores, recently patented, include elevated stands for policemen directing traffic. When not in use, they sink into excavations in the streets, presenting no obstruction to traffic. Counter-weights help to raise and lower the apparatus.*

❁ *MOBILE, ELECTRICAL air-conditioners, mounted on wheels and weighing about 600 pounds each, are being manufactured for the armed services. They cool and dehumidify the air inside aircraft undergoing field repairs in tropical heat and condition air in rooms where special work demands ordinary humidity and temperatures.*

❁ *FILTER CLOTHS made of vinyl resin yarn are acid and alkali-resistant, it is claimed. This plastic fabric can be safely used in chemical, pharmaceutical and dyestuff laboratories and manufacturing industries, the manufacturer states.*

❁ *CORRUGATED LEATHER shoe soles may become common after the war. A sole with ridges and furrows running crosswise provides non-skid qualities and is claimed to be extremely flexible.*

❁ *IDENTIFYING the 55 navigation stars is simplified by a star finder which is especially useful as a training instrument. A central cylinder is adjusted so that it is parallel with the earth's axis. Settings are then made for local time, date and the star position which is printed on the instrument's cylinder. The sighting tube will then point to the chosen star with less than a degree error.*

E FIELDS

MEDICINE

Diagnostic Instrument Shown at Cancer Congress

➤ AN INSTRUMENT for use in cancer diagnosis, called a bronchocatheter, was shown by its designer, Col. Antonino Perez Ara, of the Cuban Army's General Staff, at the First Mexican Cancer Congress in Guadalajara, Mexico.

The instrument is a long needle to be introduced through the nose to reach the lungs. Its movements can be followed on the fluoroscopic screen. At the end of the long hollow needle is a mechanism for biting out a little piece of the mass suspected of being cancer for subsequent examination under the microscope.

Colonel Perez also showed a similar needle he had designed for reaching the pancreas.

Science News Letter, November 20, 1943

NUTRITION

Drying Foods in Gas Saves Nearly All Vitamin C

➤ ALMOST all vitamin C in foods is saved by drying them in a natural gas atmosphere. Then the "atmosphere" is burned as fuel to help heat the dehydration unit. This new method promises marked improvement over air-dehydration in which 50% or more of the vitamin C is likely to be lost.

According to Dr. Paul Pavcek of the National Research Council, cabbage dried under natural gas contains as much as 75 milligrams of vitamin C in less than one-half ounce of the dried product—a generous daily supply for the adult. Potatoes dried by this new method come out perhaps four times as rich in ascorbic acid as those dehydrated in air, since the natural gas atmosphere prevents destructive oxidation, rather than encourages it.

Foods dried in natural gas are not affected in color or taste, according to officials of Godfrey L. Cabot, Inc. of Boston and Texas, who have developed the process in collaboration with Dr. Francis P. Griffiths of Massachusetts State College.

Gas-drying has been used to date only in a pilot plant. In commercial operation, it is planned to use the natural gas over and over again, adding fresh gas only to the extent needed to prevent the system from accumulating more than 0.1% of oxygen. As the used gas is drawn off, this "atmosphere" will be burned as fuel in the dehydration unit. This provides considerable saving since studies show that all the discarded gas can be used immediately as fuel, so that the new method increases costs very little.

Tests on green leafy animal feeds indicate that foods dried in a natural gas atmosphere will also keep longer than those dehydrated conventionally. Storage tests on gas-dried foods are now in progress.

The new process is believed to be practicable wherever natural gas is used commercially as a fuel. Dehydration equipment using natural gas at present can be adapted to the new process at a cost which seems moderate in view of the striking improvement in the dried food product, according to engineering estimates.

Science News Letter, November 20, 1943

SEISMOLOGY

Recent "Lost" Earthquake Was Not in Japan

➤ THE "LOST" earthquake in the Eastern Hemisphere, which came at the beginning of a new week of air-sea fighting in the upper Solomons area, had its epicenter in the Banda Sea, just on the other side of New Guinea, and not in Japan as first news dispatches conjectured.

The elusive quake was traced to its lair by seismologists of the U. S. Coast and Geodetic Survey, using data from several Pacific Ocean observatories as well as from stations in North America, transmitted by wire and radio through Science Service. The shock, which is described as "very severe," centered near latitude 5.5 degrees south, longitude 134 degrees east. Time of occurrence was 4:31.6 a.m., EWT., Nov. 6.

Overseas observatories reporting are located at Wellington, New Zealand; Perth, Australia; Apia, Samoa. Reports of American origin came from the observatories of Jesuit Seismological Association at Georgetown University, Fordham University, St. Louis University and Weston College in Massachusetts; the Seismological Laboratory of the California Institute of Technology; and the observatories of the U.S. Coast and Geodetic Survey at Sitka and College, Alaska, and at Ukiah, Calif.

Science News Letter, November 20, 1943

NUTRITION

Pre-Freezing Improves Quality of Dried Foods

➤ BETTER dried fruits and vegetables can be produced if the fresh products are frozen before the drying current of warm air is flowed over them, is the contention of M. E. Dunkley of Vernalis, Calif., who has received patent No. 2,333,850 on his process. The inventor states that the bursting of the plant cells as the ice crystals form puts them into better condition to yield up their moisture during the subsequent drying phase. He states further that the customary bleaching with sulfur fumes, which has some objectionable features, becomes unnecessary with pre-frozen dried foods.

Science News Letter, November 20, 1943

EDUCATION

"Upgrading" Course Given For War Industry Executives

➤ AN "UPGRADING" course for executives is being given to enable key men to carry broader responsibilities in rapidly expanding war industries and to facilitate the transfer to war production of executives temporarily not needed in their normal positions.

The course in "human engineering," sponsored by the Engineering, Science and Management War Training Program of the U. S. Office of Education, is given at Harvard Graduate School of Business Administration.

Some of the students are selected by their companies for this additional training needed to hold more responsible positions. Others take the course on their own initiative as a means of entering war industry.

The 15-week program is designed to give a broad foundation in production, purchasing, cost and personnel control problems. The techniques of production management are stressed as aids to effective supervision and management.

In teaching these business men, whose ages range from 35 to 60 years, specific cases based on actual problems and experiences encountered by various companies are considered. The organized discussion is lively and to the point.

To be accepted, the applicant must have demonstrated in his business experience qualifications of ability, leadership and adaptability so that upon completion of the course, he will be able to carry broader management responsibilities in war industry.

Science News Letter, November 20, 1943

NUTRITION

Thanks for Enriched Bread

"Staff of life" of colonial times was rich in nourishment provided by whole wheat berry; modern bread is artificially supplied with vitamins.

By JANE STAFFORD

➤ GRACE before Thanksgiving Day dinners this year might well include a line of thanks for enriched bread. Because in spite of how the war has hit the American dinner table, our daily bread is better than ever before and better, probably, than that eaten by any other people the world over.

Efforts to give us this better bread started long before the war, but reached full momentum under the pressure of war and its effects on the national diet. Now that the war is forcing us to depend more and more on cereal foods, we can be doubly grateful for our enriched bread which gives us this sturdier staff of life.

The bread on early American Thanksgiving dinner tables was made from stone-ground flour. This flour had in it most of the rich nourishment of the wheat berry: the protein and minerals and vitamins as well as the starch. It was, however, rather coarse and far from the snowy white flour we are accustomed to use today. The refinement of flour by modern milling processes gives a product that makes delectable bread, cakes and other baked goods, but it robs them of much of the wheat berry's nourishment other than its starch.

This did not matter so much, perhaps, so long as people could get plenty of fresh meat and fresh vegetables to supply the protein, minerals and vitamins their bodies needed. Even before the war and rationing, however, fresh meat and fresh vegetables were rather scarce items on the dinner tables of a large part of the population. According to some estimates, two-thirds of the people could not afford enough of these foods to keep themselves healthy and strong.

For the most part, these people were not actually sick in bed. They just dragged along, feeling tired and pepless, often too weak to do a good job when they had work, suffering from vague aches and ailments and getting upset too easily by trifles. Quite a number of them did get sick. They got a skin rash, sore tongue, digestive trouble. They couldn't eat anything, and some went crazy. Some died. Those were the ones with pellagra, the disease that comes from lack of a B vitamin called "niacin."

After the role of niacin in preventing and curing pellagra was discovered, doctors could fill these very sick people full of niacin and, as their appetites and digestion improved, could feed them the niacin-rich foods their bodies were starving for. But every spring the people would be sick again because during the winter they could not afford the higher priced, nourishing, fresh meat and vegetables. Even their pet dogs got sick.

Other people got neuritis. A few actually had beriberi, the disease generally considered Oriental only, because it was so prevalent in Oriental countries where the native diet consisted largely of vitamin-less polished rice. The beriberi and neuritis result from a diet lacking another B vitamin, thiamin.

There are, of course, many other B vitamins. Doctors for years have seen signs of a dietary lack of some of these other B vitamins also in their patients. In fact, about the time of the depression, doctors seeing so many patients very sick, half-sick and just a little sick from lack of vitamins became seriously worried about the situation. So did nutritionists and various governmental authorities.

It became increasingly clear that something would have to be done to get the vitamins into the food these people could afford and leaned on heavily for the bulk of their diet. Chemists had found a way to make the three main B vitamins—thiamin, niacin and riboflavin—in the laboratory. Drug manufacturing houses were making them and putting them up in vitamin pills.

These pills are all very well if you can afford them. If you can, however, the chances are you can also afford fresh meat and vegetables and do not depend largely on bread for your daily food. If you are at the economic level of a bread-potato-fat back diet, even a few cents

ENRICHED—Stone-ground flour which graced early American tables at Thanksgiving contained most of the rich nourishment of the wheat berry. Today's bread, lacking many of the B vitamins because of the refining of the flour, has vitamins added to it.

a day is more than you can afford for vitamin pills, month in and month out.

So the doctors and nutritionists and government authorities, the millers and bakers, too, decided it would be best for all concerned to enrich our fine white bread by adding to it thiamin, niacin, riboflavin and iron. The first step consisted in setting up legal standards, based on scientific knowledge, for how much of these ingredients must be in a loaf of bread that may be labelled enriched. Many bakers then produced enriched bread which they sold at no extra cost to the consumer.

For a time, the matter of making or eating enriched bread was optional. Then came the war, and the realization that all of us, rich and poor, would have to eat more bread and cereals as other foods became relatively scarce. England and Canada had already adopted a national loaf of bread to add needed nourishment to wartime diets in those countries.

In January of this year, Food Distribution Order No. 1 was issued in the United States. This required, among other things, that all bakery white pan bread sold in this country must be enriched bread. Bread baked at home, or in restaurants or institutions, could be enriched or not, but that sold at bakeries, grocery stores and the like, must be enriched.

Unfortunately, it has also been necessary because of the war to reduce the amount of milk that most bakers used to put into bread. Leaving out the milk leaves out some important calcium and protein. If our present enriched bread could be made, as bread was formerly made, with 6 per cent dried milk solids, it would be so nourishing that a loaf of bread and a tomato would be all a grown person would need for a day's food.

Even without the milk, the daily bread most of us eat is now a very nourishing product, one we can be thankful to have on our table for Thanksgiving dinner.

All of us may be eating this kind of bread before long, whether we buy bakery bread or bake it at home. Our rolls, pies, biscuits, buns, doughnuts and other bakery foods will also be enriched, if plans now under discussion can be carried out.

These plans call for enrichment not of bread alone, but of all white flour. At present some flour is enriched and some is not. Bakery bread is enriched by being made from enriched flour, or by being made with a special yeast that adds extra vitamins, or by being made from ordinary flour with a vitamin and mineral concentrate added to it.

Extending the benefits of bread enrichment to all people in the nation, regardless of where their bread is baked and of whether or not they eat rolls, biscuits and buns instead of bread, is the aim of those who argue for enrichment at the mill, not at the bakery.

The nutritional fault, it is pointed out, is with the flour, not the bread, so it would be more logical and effective to enrich the flour itself from which the bread and many other foods are made. At a public hearing last summer, bakers opposed the plan for enriching all white flour and no government order has yet been issued.

Housewives who bake their own bread and rolls, however, can get enriched flour if they wish. It has been on the market for about two years, although in some parts of the country grocers may not yet be handling it.

Science News Letter, November 20, 1943

MEDICINE

Doesn't Immunize

Tests with human volunteers show that it is possible to have a second attack of flu within four months after the first.

➤ YOU CAN GET influenza again within four months after having had an attack. The experience of a group of "human guinea pigs" who volunteered to let scientists put living influenza germs up their noses twice in four months shows this.

The tests were reported by Dr. Thomas Francis, Jr., of the University of Michigan School of Public Health at the wartime conference of the American Public Health Association in New York.

With the first dose of influenza virus, type B, most of the volunteers got sick with a mild but definite illness characteristic of influenza B. Their sickness was quite different from a cold, streptococcus infection or mild pneumonia.

Four months later, when the volunteers were given the second dose of the same virus, they again got influenza. In general they were not quite so sick and had lower temperatures, but a definite proportion had just about the same kind of attack they had the first time, only four months before.

From the standpoint of prevention of influenza, Dr. Francis points out, the experiments show that to be effective, anti-influenza measures must be able to create a sustained state of resistance greater than that which follows a single mild infection.

Science News Letter, November 20, 1943

Air Sterilization

➤ PREVENTING the spread of diseases such as influenza by continuous air disinfection is now pretty much up to industry, Dr. Stuart Mudd of the University of Pennsylvania pointed out.

This air disinfection, either by germicidal vapors or ultraviolet light, has reached the practical stage for small areas. If it is going to be used in large places, such as airplane factories and theaters, industrial firms, which will benefit so greatly in reduced absenteeism, must supply the financial and technical means necessary to reach the final stage of disinfecting the air in large rooms and buildings.

Science News Letter, November 20, 1943

The *Mississippi River* collects the drainage from about 40% of the United States.

Do You Know?

Some 25,000,000 *telephones* are in use in America.

The first locomotive *"headlight"* was a bonfire of pine knots in a bed of sand on a flat car ahead of the engine.

Canadian *flour* production for the year ended July 31 was the largest on record; it was 20% over the previous year.

Pulverized *resin* obtained from pine wood, mixed with sand in foundries, permits the use of mechanically-reclaimed old sand.

Six hundred million pounds of *seafood* are caught by New England fishermen each year, 85% of this consisting of only ten species of fish.

Tannin for the leather industry in Roumania is now obtained from native sumac leaves which when dried are about 25% tannic acid.

The *vicuna*, a rare animal of the high Andes, is prized for its fine wool; it is the smallest and rarest of New World animals of the camel family.

A new *adhesive* developed in Sweden which is suitable for many uses, may some day replace the conventional flour-paste employed in wallpapering.

The average human *heart*, weighing about one-half pound, generates enough energy in twelve hours to lift a tank car of 65 tons one foot from the ground.

Hundreds of government *geologists* are seeking critical mineral deposits such as bauxite, alunite, and high aluminum clay in the United States, Alaska, Canada, and many of the countries of Latin America.

Corn yields by-products which are used in sizing and printing textiles, in tanning leather, and in making briquettes, explosives, adhesives, laundry starches, rayon, dusting powders, dyes and inks.

Cold weather causes *rats* to migrate into buildings at this time of the year; red squill, now hard to obtain, or the more plentiful barium carbonate, may be used as a control as both are harmless to most other animals.

ASTRONOMY

Planet or Star?

Distinction between the two, formerly thought quite definite, may soon disappear as result of current searches for stars with small companions.

➤ DR. K. AA. STRAND of Sproul observatory, Swarthmore College, considers the invisible third component of the triple star 61 Cygni to be of the nature of a planet rather than a star. He believes further that a continuation of the accurate photographic observation of double stars will increase the number of such systems and will reveal stellar masses of such small magnitude that the boundary between planet and star, which has previously seemed clear enough, will disappear.

Two of five such unseen companions which he has discovered, Dr. Strand reported to the meeting of the American Astronomical Society in Cincinnati, have masses about half that of the sun, and one has a mass about one-tenth the sun's; but all three are undoubtedly stars.

Of the remainder, one is still somewhat doubtful because sufficient observational material is lacking, but the mass of the fifth one, in the 61 Cygni system, is known accurately as one sixtieth that of the sun, or 16 times Jupiter's mass. Jupiter is the largest planet in the solar system, its mass equalling that of all the other planets combined.

Dr. Peter van de Kamp, director of Sproul Observatory, reported on similar results with single stars. In this case, departures from straight-line motion across the sky are discovered by very carefully taken photographs; the departures are caused by invisible companions. Dr. van de Kamp presented a new such discovery—that of a companion to Luyten's star, the companion taking 15 years to revolve about the visible star.

Science News Letter, November 20, 1943

Star Speeds Vary With Mass

➤ LIKE the molecules of air in a room, heavyweight stars move slowly and lightweight stars move rapidly. Researches by Dr. A. N. Vyssotsky, of the Leander McCormick Observatory of the University of Virginia, on the motions and distributions of dwarf stars appear to confirm this hypothesis.

Before a symposium on dwarf stars and planet-like companions, Dr. Vyssotsky explained how his selection of the comparatively small or "dwarf" stars was made from the relative intensities of different portions of their spectra, and independently of their apparent motions across the sky. Most other methods of making the selection have been based on such motions, and any attempt to determine the average real motion was handicapped by their having been selected on the basis of motion.

It had previously appeared that dwarf stars (mostly the size of the sun and smaller) had more than their share of energy—that they moved through space too rapidly for their masses if the energy of the galaxy were equally divided. Dr. Vyssotsky has slowed the dwarfs down a bit, just enough to make it possible to apply the law of the equipartition of energy to the majority.

Science News Letter, November 20, 1943

ZOOLOGY

Tropical Termites Are Not All Pests

➤ TERMITES are not necessarily unmitigated pests, Dr. A. M. Adamson, professor of entomology at the Imperial College of Agriculture, Trinidad, told a University of California audience. Most tropical species are ground dwellers, and these seem to function very much as earthworms do in the temperate zone, reducing dead wood and other plant materials to humus by chewing and partially digesting them, and letting air and rainwater penetrate the soil.

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HISTORY OF SCIENCE

NATURE RAMBLINGS

by Frank Thone

"A Kok of Inde"

➤ TURKEY the bird is called, and turkey it will probably remain as long as the English language lasts, though its original home undoubtedly was in America. Apparently it picked up its misnomer in the same way that "Turkish" tobacco did—simply because it proved well adapted to the parts of southeastern Europe and western Asia held by the Turks when the first explorers brought back American products from the New World. When the Mediterranean nations were not fighting the Turks they were trading with them, so that the spread of American things into Turkey was easy and rapid.

Indeed, the Turkish name became attached to at least two American plants before it was given to the American fowl. When the famous early German botanist, Leonhart Fuchs, published his great herbal in 1542, exactly 50 years after the landing of Columbus, American corn, or maize, was already known as Turkish corn; Fuchs said, "This plant was brought to us recently from Turkey in Asia and Greece, so has been called Turkish corn." Another half-century later, when John Gerard published his English herbal, the name "Turkish corn" and "Turkey wheat" still persisted in England.

Turkey also received unearned credit for another American product in Fuchs' book. One of the two varieties of pumpkin he figured is labeled "Turkish cucumber."

While Fuchs was thus perpetuating in enduring print the popular errors of nomenclature of his time, an equally eminent Swiss colleague, Conrad Gesner, was diligently compiling four big volumes into which he put all existing knowledge about beasts and birds. In the second book of his *Historia Animalium* he has a somewhat distorted but still recognizable picture of a turkey. The German names given to it in the Latin text, however, translate as "Indian, or Calcutta, or Foreign fowl"; added is an English name "a kok of Inde."

This erroneous ascription of the bird to an origin in India seems to have come from the name first given it by the Spaniards, "pauou de las Indias," or fowl of the Indies. They knew well enough that it came from the West Indies, not the East, but neglected to make the fact clear to their neighbors. The Latin name used by Gesner is also a reflection of the uncertainty then felt about the bird's origin and kinship. It was called *Gallopavo,* which translates approximately as "chicken-peafowl."

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Alaska, the last great big-game reservoir in the possession of the United States, has excellent herds of moose, mountain sheep, caribou, goats, deer and bears, but they are not of sufficient size to warrant uncontrolled hunting.

MEDICINE

Pseudo-Appendicitis

Sudden severe pain mistaken for appendicitis believed due to virus infection that affects the root of the abdominal nerves.

➤ AN ACUTE infection with sudden knife-like pain that is mistaken for appendicitis is reported by Capt. Winfield L. Butsch and Lt. Col. James C. Harberson, of the Medical Corps, A. U. S. (*Journal, American Medical Association,* Oct. 16) Tentatively, the medical officers believe the cause of the illness to be a virus which affects the nerve root.

Their report is based on a study of 50 patients, all but two of whom were sent to a surgical ward of the Army Station Hospital at Camp Carson, Colo., for operation for acute appendicitis.

The men were stricken very abruptly and this is an important characteristic of the infection.

"Young men who had felt perfectly well at work, playing football, sitting in a classroom or taking a walk while off duty were suddenly seized with a knifelike abdominal pain which caused many of them to double up," the officers report. "This pain awakened them out of a deep sleep, and on one occasion struck a medical officer just as he was reaching for his alarm clock."

This medical officer's observations on himself were very helpful in distinguishing the illness from appendicitis. He had already had his appendix out some years before.

Nausea and vomiting practically always occurred within the first few hours, and this added to the suspicion of appendicitis. Pointing also to appendicitis was the location of the pain—usually in the right middle or lower right of the abdomen.

Distinguishing symptoms are listed by the Army surgeons as an aid in telling the infection from appendicitis:

1. The pain is localized right away. It is not generalized at first, later becoming localized, as in appendicitis.

2. The patient's face gets brick red, not just on the cheeks but all over. The soft palate is entirely covered with a raised plaque of swollen mucous membrane that is salmon pink.

3. The pain is worse at night and when the patient lies down, like pain of nerve root irritation.

4. Like the pain of nerve root irritation, this pain is intensified by coughing, by flexing the neck or by sitting up with the knees extended.

5. There is tenderness over the course of nerves in the abdomen.

6. The white blood cell count is not raised, as it is in appendicitis, but remains normal or lower than normal.

The surgeons warn, however, against assuming that appendicitis is not the trouble if the patient has pain and tenderness in the right lower quadrant of the abdomen. Only after the most careful and repeated observations are made, is it safe to make such an assumption.

Science News Letter, November 20, 1943

ENGINEERING

Bumper-Mounted Snowplow Devised for Automobile

➤ A SNOWPLOW adapted for mounting on the front end of an ordinary automobile is protected by a pair of patents, Nos. 2,333,360 and 2,333,361, both issued to H. B. Churchill of Rye, N. Y. It is of the familiar V-shaped pattern, with fittings that secure it to the bumper. When the path from the garage to the street has been cleared, the plow can be quickly detached and compactly folded up.

Science News Letter, November 20, 1943

First Glances at New Books

➤ DAVID FAIRCHILD has roamed the world, and especially the Eastern tropics, for many years in search of good plants and their seeds to bring home and plant in the United States. In GARDEN ISLANDS OF THE GREAT EAST he tells, in his own vivid fashion, of happy wanderings in islands now strangled in the grip of the enemy—much of the water mileage covered in a chartered Chinese junk. One is left wondering: will these lands and their peoples go back to their pleasant ways once the present nightmare is exorcised? Or has the shock been too great to permit reversion? (*Scribner's,* $3.75)

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➤ THE NOTABLE SERIES of BIOLOGICAL SYMPOSIA achieves its tenth volume in *Frontiers in Cytochemistry,* edited by Normand L. Hoerr. An imposing group of leading names in cytology and microchemistry is appended to chapters on such subjects as the chemical structure of cytoplasm, the nature and distribution of proteins in cell and nucleus, mineral distribution in the cytoplasm, etc. The *Jaques Cattell Press* is to be congratulated on the inception and successful execution of this important and useful series of books. ($3.50)

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➤ EXPLOSIVES are compelling a great deal of attention nowadays, and thousands of young people who normally would have little to do with them are having to cultivate a particularly intimate acquaintance. Prof. Martin Meyer, in THE SCIENCE OF EXPLOSIVES, offers thorough-going information of professional grade, but not too great technical demands, in suitable form for rapid learning by young men who will be using explosives, as well as for persons of any age who are concerned with the making and handling of munitions. Discussion questions and exercises at the end of each chapter help in adapting the book to class use.

Science News Letter, November 20, 1943

• Just Off the Press •

ANIMAL REVEILLE—Richard Dempewolff *Doubleday, Doran,* 272 p., illus., $3.

ARCHEOLOGICAL INVESTIGATION IN PLATTE AND CLAY COUNTIES, MISSOURI—Waldo R. Wedel—*Govt. Print. Office,* 284 p., illus., $1.

CLINCHING THE VICTORY—Eldon Griffin—*Wilberlilla Pub.,* 365 p., $2. Proposals for the future by an author who appears to have particular interest in problems of the Pacific.

CRIMINAL CAREERS IN RETROSPECT—Sheldon and Eleanor Glueck—*Commonwealth Fund,* 380 p., tables, $3.50.

DANGER IN THE CARDS—Michael MacDougall—*Ziff-Davis,* 236 p., $2.50.

DETERIORATION OF FIRE-KILLED DOUGLAS FIR—J. W. Kimmey and R. L. Furniss—*Dept. of Agr.,* 61 p., illus., 15c., Technical Bulletin No. 851.

GENERAL SCIENCE WORKBOOK—Gilbert H. Trafton and Victor C. Smith—*Lippincott,* 307 p., illus., $1, paper, revised ed.

JANE'S FIGHTING SHIPS—Francis E. McMurtrie, ed.—*Macmillan,* 582 p., illus., $19.

MAKING BOOKS WORK: A Guide To The Use Of Libraries—Jennie M. Flexner—*Simon and Schuster,* 271 p., $2.50.

PLASTICS—J. H. DuBois—*Amer. Tech. Society,* 435 p., illus., $3.75, 2nd ed. This is a second edition revised and enlarged. The greater portion of the 144 new pages is devoted to the new types of synthetic rubber.

REPORTS MADE AT THE JUBILEE SESSION OF THE ACADEMY OF SCIENCES: Celebrating the Twenty-fifth Anniversary of the U.S.S.R.—*American Russian Institute,* 47 p., 25c., paper. The reports are entitled: "Development of the Exact Sciences in the U.S.S.R.," by A. F. Joffe, and "Twenty Five Years of Power Development in the U.S.S.R.," by A. V. Winter.

SCIENCE EXCURSIONS INTO THE COMMUNITY: A Handbook for Teachers of Grades Four Through Eight—George E. Pitluga—*Columbia Univ.,* 154 p., $1.75, paper.

THE SCIENCE OF EXPLOSIVES: An Introduction to Their Chemistry, Production, and Analysis—Martin Meyer—*Crowell,* 452 p., illus., $4.50.

SYMPOSIUM ON PAINT—American Society for Testing Materials—*Amer. Society for Testing Materials,* 60 p., illus., $1.

THESE ARE THE GENERALS—General Johnson Hagood and others. Foreword by Walter Millis—*Knopf,* 259 p., $2.50.

TO ALL HANDS: An Amphibious Adventure—Lt. John Mason Brown, USNR—*Whittlesey House,* 236 p., illus., $2.75.

WORLD WARS AND REVOLUTIONS: The Course of Europe Since 1900—Walter Phelps Hall—*Appleton-Century,* 406 p., illus., $4.50.

YOUR BUDGET IN WARTIME—Ethel Laney—*World Pub. Co.,* 127 p., illus., 49c. Prepared by a newspaper budget editor.

YOUTH CAN COUNT NOW AND TOMORROW—Paúl Harris, Jr.—*Assn. Press,* 61 p., 60c., paper. A work of the International Committee of the Y.M.C.A.'s.

•New Machines and Gadgets•

⚙ *SPECIAL washing machines closely resembling ordinary home washers are used in at least one hospital to heat and wring heavy woolen cloths, known as "packs," which are wrapped around children suffering from infantile paralysis. Electric water heaters are substituted for the agitators.*

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⚙ *SHRINKABLE covering for beverage bottles, made of a cellulose material which resembles gold foil, is put over the bottle while wet and dries to a perfect fit. It contains mica particles and yellow coloring. This patented covering is designed to make the beverage bottles more attractive.*

Science News Letter, November 20, 1943

⚙ *CADMIUM plating to protect iron and steel from corrosion is now applied electrolytically in coats 50 times as thick as formerly. By a new process steel plates eight feet long, two feet wide and an inch thick are coated with 30 pounds of cadmium to a uniform depth of two-hundredths of an inch.*

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⚙ *BLIND WORKERS at a Canadian aircraft plant sort bolts and screws by use of two fixed metal rods built at a slight angle to each other, as shown in the picture. A bolt is moved along between the rods until it touches both, closing an electric circuit and ringing a buzzer. The blind worker then drops the bolt into a compartment just below.*

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⚙ *GREASE has been developed that will work in aircraft controls in desert high temperatures and ten minutes later in stratosphere cold 70 degrees below zero Fahrenheit. Certain soaps of a soft silvery metal were used as a base. It is made by cooking the base soap to combine with oil.*

Science News Letter, November 20, 1943

⚙ *COMBINED razor strop and container recently patented consists of a flat box with space at one end to store the safety razor and a hone at the other. By a simple mechanism a blade fixed in a special holder is repeatedly drawn across the honing strip.*

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⚙ *ELECTRICALLY operated windshield wiper, recently patented, has an improved clutch mechanism which insures good action and the placement of the blades where they will not obstruct vision when not in use. It is simple and inexpensive to manufacture.*

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If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, *1719 N St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 183.*

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RADIO

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SOCIOLOGY

What agency is making plans to find post-war jobs for 31,000,000? p. 322.

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